

STOP-Bang Questionnaire Screening for Sleep Apnea Treatment
In An Outpatient Surgical Center
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Abstract

Background: Sleep apnea is often undiagnosed, increasing in prevalence and contributes to anesthetic risk. Sleep apnea is associated with hypertension resistant to treatment, cardiac arrhythmias and stroke. It is critical for anesthesia providers to use the STOP-Bang Questionnaire to screen patients for sleep apnea risk factors and severity and to develop a care plan which will lead to a safe anesthetic outcome.

Purpose: This study used the STOP-Bang Questionnaire pre-operatively to screen, identify and educate patients about their sleep apnea risk factors. The objectives of this study were to examine the effect of sleep apnea screening on patients' decisions regarding further evaluation of sleep apnea with PCPs and Sleep Medicine Practitioners, as well as identify facilitators and barriers to further evaluation.

Methods: Patients at an outpatient surgical center were screened by an anesthesia provider with the STOP-Bang Questionnaire. Patients with STOP-Bang scores equal to or greater than 3 were educated and instructed to follow-up with their Primary Care Provider. Each patient received a copy of their completed questionnaire and information from www.stopbang.ca describing the long-term health effects of untreated sleep apnea. Patients consented to have the anesthesia provider notify their PCPs regarding their sleep apnea risk factors. The researcher followed up with patients in three months to determine whether patients sought further evaluation and treatment for sleep apnea.

Results: Thirty two patients with scores ≥ 3 agreed to participate. Fifteen patients discussed sleep apnea risk with their PCPs within 3 months, among whom, 9 patients consulted Sleep Medicine Practitioners and completed sleep studies. Of these 15, four patients PCPs did not think their patient needed to have a sleep study. The remaining 2 patients who visited the PCP did not want to follow thru with the sleep study even though the PCP recommended that they do. Eight patients from the original sample of 32 intended to discuss sleep apnea during their next scheduled visit with their PCPs. The remaining 9 patients gave various reasons for lack of follow-up with their PCPs.

Conclusion: Sleep apnea is widely undiagnosed and few providers screen patients for sleep apnea. STOP-Bang screening and education at the outpatient surgical center can help identify sleep apnea risk factors and encourage patients' further evaluation and treatment of sleep apnea.

Obstructive Sleep Apnea is characterized by intermittent and recurrent episodes of partial or complete upper airway obstruction during sleep (Vasu et al., 2012). Partial or complete airway closure causes several episodes per hour of hypoxia, hypercarbia, gasping or choking, and sympathetic stimulation leading to arousal during sleep, which if untreated can lead to cardiac and cerebrovascular damage. Untreated sleep apnea is associated with numerous safety and health consequences including motor vehicle accidents, gastro-intestinal reflux, hypertension resistant to treatment, non-insulin dependent diabetes mellitus, metabolic syndrome, transient ischemic attacks (TIA), cerebrovascular accidents, cardiac arrhythmias such as atrial fibrillation, congestive heart failure, coronary artery disease, and myocardial infarction (Kulkarni, Horst, Eberhardt, Kumar, Sarker, 2014).

Obstructive Sleep Apnea (OSA) is estimated to occur in approximately 43% of men and 27% of women between the ages of 50 and 70, and 26% of men and 9% of women between the ages of 30 and 49 (Burger, 2017). Undiagnosed OSA is serious in patients who present for surgery. It is critical to recognize whether a patient has sleep apnea during the pre-operative period because, “patients with OSA have a 2 to 3 times higher risk of cardio-pulmonary complications than patients who do not have the condition (SASM, 2016).”

Polysomnogram is the “gold standard” test for the diagnosis of OSA. According to the American Academy of Sleep Medicine Task Force Apnea-Hypopnea Index (AHI), the number of episodes of apnea/ hypopnea per hour defines the severity of sleep apnea into categories of none (<5), mild (5-15), moderate to severe (15-30), and severe (>30) (Iber et al., 2007). The absence of chest excursion (apnea) or decreased chest excursion (hypopnea) combined with oxygen desaturation of 4% measured by pulse oximetry accounts for one episode of apnea/hypopnea during Polysomnogram (PSG). Laboratory polysomnogram requires an overnight stay, and is

labor intensive and costly. Demand for in-laboratory sleep apnea testing is increasing, however, unpopular by potential patients, resulting in delayed diagnosis and treatment. Home sleep testing is an option which costs half of in-laboratory testing and may lead to earlier diagnosis and treatment. It is beneficial to use a simple questionnaire/tool to assess patients' sleep apnea risk before pursuing further diagnosis with home sleep testing or in-laboratory Polysomnogram.

Background

The STOP-Bang Questionnaire is a concise tool which may yield information about daytime sleepiness, snoring and observed apnea during sleep and lead to referral to a Sleep Medicine Practitioner for further evaluation with a Polysomnogram. The STOP-Bang Questionnaire is a valid and reliable screening tool for identifying patients at risk for sleep apnea (Chung et al., 2012). Unlike other questionnaires it is easy for patients and clinicians to complete, and does not require difficult calculations or computer programs to score. Recently published guidelines from the American Society of Anesthesiologists (ASA), the Society of Anesthesia and Sleep Medicine (SASM) and the Society of Ambulatory Anesthesiologists (SAMBA) recommend the implementation of sleep apnea programs using the STOP-Bang Questionnaire preoperatively.

Anesthesia providers should routinely use the STOP-Bang Questionnaire to screen patients preoperatively for sleep apnea risk and severity and accordingly to develop an anesthetic care plan. This screening tool identifies with reasonable accuracy, OSA cases and results in the better management of OSA patients as there needs to be a collaborative effort among the Primary Care Provider, the surgeon the anesthesia provider and the patient (SASM, 2016). The purpose of this pilot study was to determine whether screening patients with the STOP-Bang Questionnaire at an

ambulatory surgical center and notifying the PCP regarding patients' sleep apnea risk is an effective way to promote patients' identification, diagnosis and obtaining treatment for OSA.

Method

Study Design: This prospective descriptive study used the STOP-Bang Questionnaire to screen patients prior to anesthesia in an ambulatory care center aiming at referring patients for further evaluation of OSA. Specifically, this study evaluated the feasibility of using the STOP-Bang Questionnaire to 1) screen patients before a surgical procedure in order to form an anesthetic care plan; 2) inform the patient of their sleep apnea risk factors; 3) provide pre and post procedure education and counseling regarding the long-term health effects of untreated sleep apnea; and 4) encourage patient discussion with their primary Care Provider (PCP) and follow through with a sleep study if recommended by their PCP.

Sample and Setting

All patients scheduled for surgery at an Ambulatory Surgical Center from June to September 2016 in the northeast U.S. were screened with the STOP-Bang Questionnaire. Patients who met the following inclusion criteria were recruited to participate in this study; 1) older than 18 years old and scheduled for surgery or endoscopy; and 2) STOP-Bang score of 3 or greater. Patients who had been previously diagnosed with Obstructive Sleep Apnea or who had epilepsy or any neurological condition that would interfere with Electroencephalograms (EEG) were excluded. The study used a non-probability convenience sample with follow-up contact with patients from September through December 2016.

Study Procedure

Beginning in June, proceeding until September 2016 patients who were admitted to the Ambulatory Surgical Center and signed a consent to participate in the study had their height, weight, Body Mass Index (BMI) and neck circumference measured. The patient was also asked

to answer the STOP (Snoring, Tired, Obstructed airway during sleep, High Blood Pressure) portion of the Questionnaire and several demographic questions about their education, marital status, income, and race/ethnic background. Patients' whose STOP-Bang scores were equal to or greater than 3 were given printed information about the long-term health effects of untreated sleep apnea from stopbang.ca and were encouraged to learn more about sleep apnea from the official STOP-Bang website at www.stopbang.ca. These patients' PCPs were contacted by the researcher to inform them of patients' sleep apnea risks and participation in the study, and to ask the PCPs to further evaluate and discuss the need for follow-up with Sleep Medicine Practitioners. The researcher then contacted the patients by telephone between two and three months after the initial screening to learn about their follow-up with the PCPs and consultation with Sleep Medicine Practitioners. During the telephone conversation, facilitators and barriers to follow-up were sought by the researcher using a checklist of probes to prompt discussion of the process from the patients' perspectives. The researcher transcribed the data if the patients replied with responses not included in the checklist. The study was approved by the Institutional Review Board at the University of Massachusetts Lowell.

Results

Sample Description

Thirty-two patients, 29 males and 3 females, with STOP-Bang scores ≥ 3 agreed to participate in this study. The youngest participant in the study was 24 the oldest was 84. Approximately 90% of the sample were older than 50 years of age. The mean age was 57.5 and the standard deviation of the sample was 11.4. Over 50% of the participants had a Body Mass Index (BMI) greater than 35kg/m². The mean BMI was 30.6 with a standard deviation of 4.6. More than 80% of the sample had STOP-Bang scores equal to or greater than 5, denoting high risk for sleep apnea. Eighty-four percent of the participants were married (see Table 1).

Table 1: Sample demographics

Variables	Mean±SD or Percentage
Age	57.5±11.4
20-30	3.1%
30-40	6.2%
40-50	-----
50-60	46.8%
60-70	34.3%
70-80	6.2%
Education	
High School	31%
Technical School	12.5%
BA/BS	31.1%
Graduate Degree	25%
Income	
<30 K	3.12%
<50 K	12.5%
<75 K	21.9%
<100 K	3.12%
>100 K	56%
Unknown	3.1%
BMI	30.6±4.6
Normal	6%
Overweight	40.3%
Obese	27.9%
Very obese	24.8%
STOP-Bang score	
3	3.1%
4	15.6%
5	50%
6	18.7%
7	12.5%

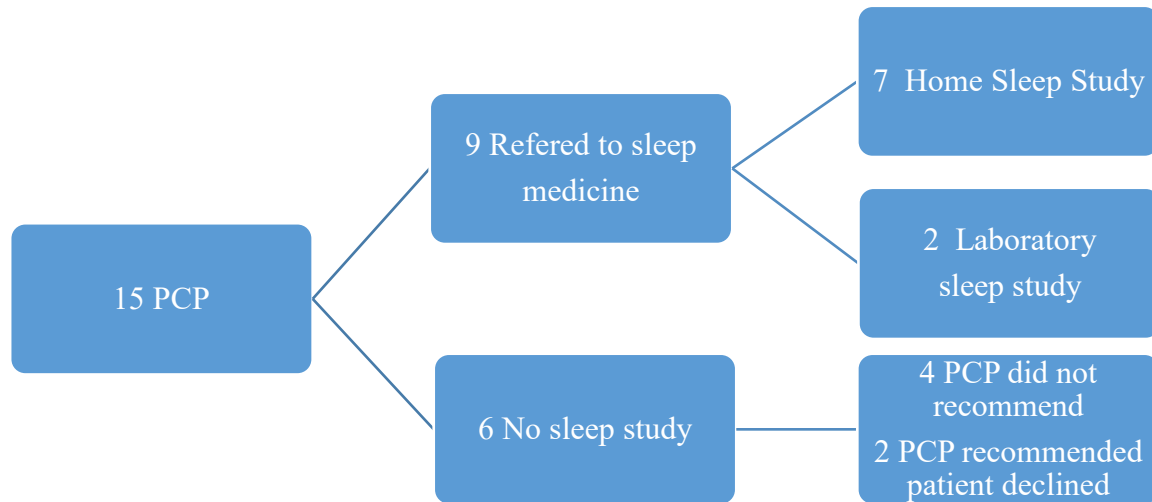
Descriptive Quantitative Findings

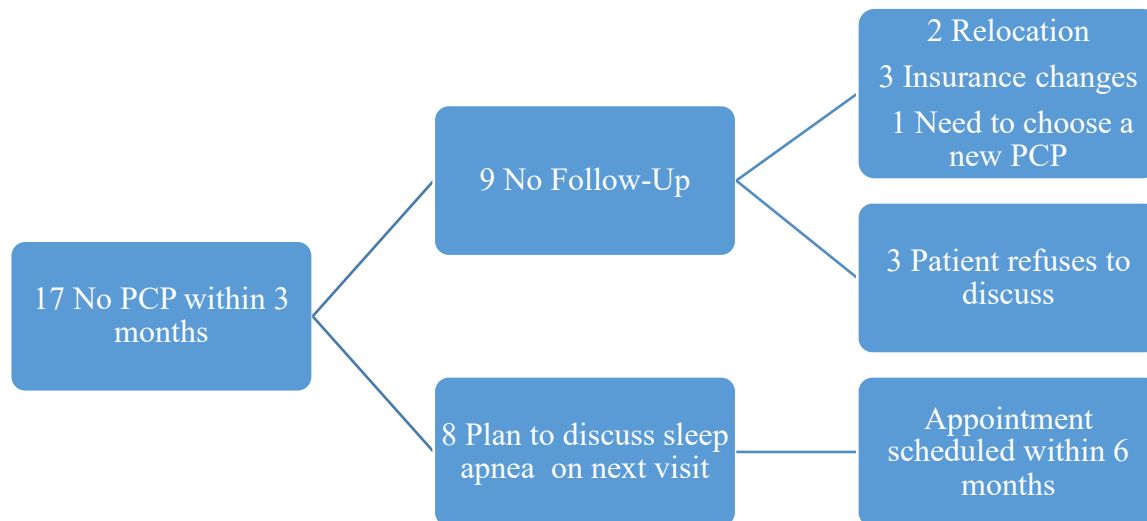
Fifteen patients consulted their PCPs within 3 months. Nine of these 15 consulted Sleep Medicine Practitioners and completed sleep studies. Of the 15, four PCPs did not feel their patients required sleep studies. The remaining 2 patients who visited their PCPs did not want to follow through with their sleep study even though their PCP recommended they do. Eight patients from the original sample of 32 intend to discuss sleep apnea on their next scheduled

appointment with their PCPs. The remaining nine patients gave various reasons for not following up with their PCPs (see Figure 1).

Figure 1: Sample Movement

Clients Who Sought Follow-Up



Clients Who Did Not Seek Follow-Up

At follow-up many patients provided further information. Patients noted that the, completed STOP-Bang Questionnaire, information from www.stopbang.ca and www.sleepmedicine.com and discussion with their significant other during the admission process motivated them to discuss their sleep apnea risk and seek advice from their PCP. Patients were receptive to information about sleep apnea especially when the relationship between snoring, apneic episodes and the long-term health effects of these events were described. Patients were also advised of the likelihood of having sleep apnea if a parent or sibling has been diagnosed with sleep apnea.

Patients were also encouraged to consult a Sleep Medicine Practitioner after speaking with their Primary Care Physician. One patient stated, "I know I need to have a sleep study but I am the primary care giver for my elderly mother and I only sleep a few hours at a time anyway, but I will have a sleep study in the future."

Other barriers to follow-up were that patients were expecting the PCP to call them regarding follow-up and the PCP had not contacted them, the need to choose a new PCP, patient relocation to other states, changes in insurance coverage, and responsibilities that interfered with scheduling a sleep study. Unfortunately, some patients refused to disclose the reasons they did not follow-up.

Discussion/Conclusion

Despite the researcher's description of the health consequences of untreated sleep apnea, approximately 30 patients decided not to participate in the study. The majority of these patients' STOP-Bang scores were 4 or 5. These patients were given their completed STOP-Bang Questionnaire and printed educational material from www.stopbang.ca. The researcher's inability to persuade these patients to participate in the study was frustrating but these patients may decide to speak to their PCP about sleep apnea risk on their own in the future. Patients may need to hear about the long-term health consequences of untreated sleep apnea from several practitioners before they consent to having a sleep study.

Twenty nine out of the thirty-two participants were men. Wives were instrumentally supportive in encouraging their husbands to participate in the study. During the screening process, one wife indicated that when the couple spoke to the PCP about her spouse snoring, the PCP told the wife to go to sleep before the husband. Several spouses described situations when their husband stopped breathing during their sleep and then several seconds passed until the men took their next breath or were nudged to take a breath. Loud snoring, daytime somnolence, obstructed breathing with pauses or choking or gasping on awakening and elevated blood pressure which requires treatment are important predictors of obstructive sleep apnea.

Other spouses admitted that they sleep in another room because the husband's snoring interfered with their sleep. One patient's wife indicated that she didn't think her husband would follow-up but still encouraged the researcher's discussion of the health consequences of sleep

apnea with him and notification of his PCP with his STOP-Bang score.

Fifteen of the 60 patients screened for sleep apnea and advised to participate in this pilot study consulted their PCP. Patients who refused to participate or to speak to their PCP were encouraged to further assess their sleep apnea risk and learn more about the risks of untreated sleep apnea such as heart attack and stroke at www.stopbang.ca and www.sleepmedicine.com by the researcher before discharge from BASC or during the follow up telephone call.

During one follow-up telephone call, a patient thanked the researcher for screening for sleep apnea because this motivated him to have a sleep study. When he used his Continuous Positive Airway Pressure (CPAP), his Apnea Hypopnea Index (AHI) was reduced from 84 to 1 per hour. He stated, “I have been in denial for so long.”

Obstructive Sleep Apnea is a serious health problem that leads to significant negative outcomes. Better management of OSA patients requires a collaborative effort between the surgeon, the PCP, the patient and the anesthesiologist (SASM, 2016). All health care providers must work together to educate patients and family members and to facilitate comprehensive evaluation.

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